

Appl. No. 10/021,314
Amtd. dated December 9, 2003
Reply to Office Action of September 10, 2003

Amendments to the Claims:

The listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A disk drive comprising:

~~a head adapted constructed and arranged to fly above the surface of a rotating disk for reading or writing data on the disk;~~

~~a collision monitor which detects continuous (or continual?) contact of the head with the surface of the disk;~~

~~a sensor which detects disturbance; and~~

~~a controller for, in the event that the continuous (or continual) contact of the head with the surface of the disk is detected by the collision monitor and disturbance is detected by the sensor, performing a head contact avoidance operation which performs a head contact avoidance operation for changing a floating state of the head and restoring a normal floating state of the head when contact, according to predetermined criteria, of the head with the surface of the disk is detected by the collision monitor and disturbance is detected by the sensor.~~

2. (Currently Amended) A disk drive according to claim 1, wherein the controller performs the contact avoidance operation by increasing the rotational speed of the disk above its normal rotational speed to thereby increase the flying height of the head above the rotating disk and restoring normal rotational speed to the disk.

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3. (Cancel)

4. (Currently Amended) A disk drive according to claim 1, wherein the controller performs the contact avoidance operation by carrying out an unload operation of moving the head to a given rest position outside the disk from an operating position above the disk, and a load operation of returning the head from the rest position to the operating position.

5. (Cancel)

6. (Original) A disk drive according to claim 1, wherein the controller includes storage means for storing the frequency at which the contact avoidance operation is performed and, when the frequency of the contact avoidance operation is beyond a permissible range, carries out a given emergency operation.

7. (Original) A disk drive according to claim 1, wherein the collision monitor determines that the head is continuous contact with the surface of the disk on the basis of a change in a read signal corresponding to servo data prerecorded on the disk when it is read by the head.

8. (Original) A disk drive according to claim 1, wherein the sensor is one for sensing air pressure.

9. (Original) A disk drive according to claim 8, wherein the controller carries out a given emergency operation in the event that the sensor detects, as the disturbance, air

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pressure outside a permissible range which is abnormally low in comparison with the standard air pressure.

10. (Original) A disk drive according to claim 1, wherein the sensor is an acceleration sensor for detecting an externally applied shock.

11. (Currently Amended) A disk drive according to claim 10, wherein the controller performs an emergency operation of stopping the move control of the head at the start of the contact avoidance operation and, in the event that a shock is detected by the acceleration sensor, performing a forced unload operation of forcibly moving the head to a given rest position outside the disk.

12. (Original) A disk drive according to claim 1, wherein the sensor is one for detecting ambient temperature.

13. (Original) A disk drive according to claim 12, wherein the controller carries out a given emergency operation in the event that the sensor detects, as the disturbance, temperature outside a permissible range which is abnormal in comparison with the standard temperature.

14. (Currently Amended) For use with a disk drive having a head adapted constructed and arranged to fly above the surface of a rotating disk for reading or writing data on the disk, a method of avoiding contact or collision of the head with the surface of the disk, the method comprising:

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detecting continuous contact exceeding a predetermined duration of the head with the surface of the disk;

detecting disturbance to the disk drive; and

performing a head contact avoidance operation for changing a floating state of the head and restoring a normal floating state of the head when in the event that the continuous contact of the head with the surface of the disk is detected and disturbance is detected.

15. (Cancel)

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16. (Original) The method according to claim 14, further comprising the performing a given emergency operation when the degree of the disturbance is outside a permissible range.

17. (Original) The method according to claim 14, further comprising the stopping restoring the head to its original state when the degree of the disturbance is outside a permissible range.

18. (Currently Amended) The method according to claim 14, further comprising the performing a forced unload operation of moving the head to a rest position outside the disk from an operating position above the disk, and a load operation of returning the head from the rest position to the operating position, stopping the move control of the head at the start of the contact avoidance operation and, in the event that disturbance is detected, forcibly moving the head to a given position outside the disk.

19. (Currently Amended) The method according to claim 14, wherein the contact

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avoidance operation comprises increasing the rotational speed of the disk above its normal rotational speed to thereby increase the flying height of the head above the rotating disk and restoring the normal rotational speed to the disk.

20. (Cancel)